

JOURNAL
OF THE
WASHINGTON ACADEMY OF SCIENCES

VOL. 14

MARCH 4, 1924

No. 5

ZOOLOGY.—*A new family of spined millipeds from Central China.*
O. F. COOK and H. F. LOOMIS, Department of Agriculture.

Reduction of the milliped fauna is one of the effects of deforestation. Exposure to extreme conditions of temperature and dryness are fatal to the more delicate creatures that live in the humus layer of the soil. The cultivated regions of Central China have few millipeds, but remnants of a larger fauna are still to be found in districts that are sufficiently mountainous or broken to interfere with farming or to prevent complete deforestation and denudation of the soil. Such protection for the humus fauna is afforded in the "Lu Shan," or Lu mountains, south of Kiukiang in the province of Kiang-si, a small district of broken country surrounded by fertile plains that no doubt have been cultivated intensively for thousands of years. Some of the valleys and declivities of these mountains are so steep and rocky that any possibility of former cultivation is excluded. Even the gentler slopes of the valleys are not well suited to the Chinese methods of farming and apparently have never been used for this purpose, though the whole of this small mountain area probably has been ravaged for fuel through many centuries.

Undoubtedly the Lu Shan country was covered originally with heavy forests but these probably were cut down and replaced long ago by a growth of coppice like that of the present day, with the trees held strictly in check by charcoal burning. In the more sheltered places the protection afforded by the coppice has been sufficient to maintain the humus layer, and thus to permit the survival of millipeds, including the remarkable new form that is here described. This creature was most abundant near a locality known as "Three Trees," the site of a small Buddhist monastery where two giant *Cryptomerias* and an enormous ginkgo have been allowed to grow, apparently the only trees that have been spared by the Chinese in the whole district.

Recently, however, one of the Lu Shan valleys has been occupied by a summer settlement of missionaries at Kuling. Here trees are protected from the charcoal burners so that a renewal of the forests is shown to be possible, if charcoal burning were regulated.

That special conditions were necessary for the survival of this peculiar milliped would hardly be doubted when its characteristics are considered. In comparison with other diplopoda such an animal obviously would be placed at a disadvantage by the excessive armature of the body, each of the segments being provided with a pair of relatively enormous spine-like processes, shaped like the trunk of a tree with four or five branches. Also the legs and antennae are much elongated, projecting on each side two or three times the width of the body. Thus the animal requires for its movements a much larger space than any other milliped of similar size, and is the most extreme example among millipeds of the tendency to exaggeration of extremities that usually is associated with the habit of living in caves.

Except that the creature is a member of the large group of 20-segmented millipeds (Order *Merocheta*), its relationships are not apparent, so that a new family as well as a new genus is proposed. So great is the departure of this milliped from any other known form that rather extensive descriptions seem justified in the interest of morphology, paleontology, and evolution, as well as of systematic zoology.¹

Hylomidae, new family.

Body small, slender, moniliform, more than 10 times as long as wide, not closely coiled; head very large and prominent, wider than the body, the antennal sockets below the middle and close together; antennae and legs very long and slender, projecting on each side for more than twice the width of the body.

Segments with a dorsal armature of 2 transverse rows of spines, separated by a rather shallow transverse depression, but lacking a distinct groove or furrow; lateral carinae replaced by very large erect or strongly ascending branched processes, equal in length to the width of the body cavity (see fig. 1); repugnatorial pores on the lateral processes of segments 5, 7, 9, 10, 12, 13, 15 to 19; sterna rather broad, not spined; the spiracles with very prominent raised rims, forming distinct papillae on anterior segments.

Last segment triangular, the apex narrowly truncate, projecting beyond the anal valves, with a large setiferous spine on each side and several smaller setiferous spines.

Secondary sexual characters of males: body more slender and with longer appendages; sternum of segment 5 with a large protuberance; legs of segment 6 with the third joint crassate above the middle, bearing a large thumb-like process on the ventral side at the base of the thickened portion of the joint.

¹ An enlarged photograph of *Hylomus* is being published in the Journal of Heredity for January, 1924, with a discussion of evolution in millipeds.

The long branched processes replacing the lateral carinae are the unique feature at once separating this family from any other of the existing types of millipeds hitherto recognized. These processes may be considered as carinae since they bear the repugnatorial pores near the base, but there is no resemblance to the usual form of the carinae in this order, as lateral ridges or expansions of the dorsal surface. The processes stand at the ends of a transverse dorsal depression and taper rapidly from a circular base occupying about one-third of the length of the posterior subsegments. Only among the fossil types of millipeds have such extreme modifications of the segments been reported.

The group relationships are not obvious, but a provisional association with the *Scytonotidae* is suggested by the general form and proportions of the body, as well as by the secondary sexual characters, though the same legs are not specialized in *Scytonotus*, nor the same joints of the legs, joint 5 being chiefly modified in *Scytonotus* instead of joint 3, as in *Hylomus*. Similar processes occur in the third joint of the legs at segments 5 or 6 in several tropical genera, as *Cnedmodesmus* from Africa and *Priodesmus* from South America.

Hylomus, new genus.

Diagnosis: Characters as stated above in the family description, which may be supplemented as follows:

Head much wider than the first segment, projecting in front for more than the length of the first segment; antennae separated by less than the width of a socket, very long and slender; joints 1 and 7 short, the others long; joints 2 and 6 slightly shorter than joints 3 to 5.

First segment with a branched or compound process on either side, a series of 6 large, forwardly directed, simple spines along the anterior margin, 4 smaller spines along the posterior margin, and 2 very small spines near middle of segment; segments 2, 3, and 4 shorter than any of the others; segments 2 and 3 with a distinct oblique flange below, that of segment 2 somewhat embracing the sides of the head.

Subsequent segments with a large, erect or ascending process on each side, about as long as the diameter of the body; processes of anterior segments with 4 prongs, of the middle segments with 5 prongs, an interior transverse row of 4 small simple spines near front margin, more distinct on the anterior and posterior segments, very small on the middle segments; a posterior row of two large erect-retrorse spines close to the posterior margin; all spines with a seta on one side near the tip; anterior subsegments very minutely and evenly reticulate; posterior subsegments minutely granular over the dorsal and lateral surface, including the base of the spines.

Penultimate segment with the compound processes smaller and more simple, the inner branch becoming separate, giving 4 spines on the posterior margin, the anterior row of 4 smaller spines crossing the middle of the segment.

Last segment subtriangular, projecting beyond the anal valves, the apex distinctly truncate with a large conical, setiferous tubercle on either side and 8 smaller setiferous tubercles.

Anal valves but little inflated, with 2 setiferous tubercles.

Repugnatorial pores small, located on the outer face of the lateral processes between the base and the first branch.

Legs very long and slender, the longest equaling or 2 or 3 times the diameter of the body; joint 3 much exceeding the others; sterna rather broad, minutely granular, pilose, with a slight transverse impression.

Gonopods rather slender, subarcuate, with 2 slender subequal, subapical simple branches directed obliquely mesad (see fig. 2).

Slow-moving creatures; when disturbed forming a loose coil with the legs out.

The type species is *Hylomus draco*, new species, from Central China. The generic name alludes to the armature of the body, consisting of large dendritic spines.

Hylomus draco, new species.

Length from 12 mm. in small males to 22 mm. in large female; width of body cavity 1 mm. in males, 1.5 mm. in females, of segments with spines 2 mm.

Color of living animals purple or pink, vertex and clypeus brownish on the deeply colored specimens; anterior segments to about the 7th with the large spines distinctly pinkish or purplish, more deeply tinged than the segments, also a small area of the segment at the base of the spines deeply tinged; remainder of body purplish pink, salmon or buff; some specimens distinctly brownish below the spines, with a pink band across the posterior border, others nearly white or pale purplish throughout, the spines pink; also a narrow dark median line may be shown, the skeleton being very delicate and translucent; antennae and terminal joints of the legs rather light brownish, basal joints of legs white; legs 6 and 7 of males with the thickened third joint more deeply colored.

Vertex with a very pronounced median sulcus; the surface moderately hairy, beset with minute sharp tubercles or spicules; clypeus also hairy and tuberculate; labrum with strongly converging sides, a distinct emargination and three prominent teeth, also a submarginal row of 10 to 12 bristles.

Antennae moderately pilose; joint 1 short and stout; joint 2 slightly curved; joint 6 slightly clavate; last joint subconic, about one-fifth as long as joint 6.

First segment about as wide as the second segment and twice as long, semielliptic, evenly rounded in front, the posterior margin nearly straight; much narrower than the head, seen from the front as a small cap or crown scarcely wider than the vertex, except for the ascending lateral spines, which are somewhat smaller than on other segments and have only 2 branches; other spines as stated in the generic description, a distinct median sulcus beginning at the anterior margin and extending across two-thirds of the segment.

Segments 2 to 4 decidedly shorter than those following; segment 2 the shortest, the anterior row of 4 small spines more distinct; segment 4 with a very large prominent spiracle.

Segments 2 to 18 with a large, erect or somewhat oblique process on each side of the posterior half of the subsegment, equal or exceeding in length the diameter of the body in the male, or approximating the diameter in the female; each process with 4 arms or branches, 2 near the middle or below, the posterior branch larger, and 2 apical branches, sometimes a fifth branch between the middle and terminal spines. The lateral processes are bent slightly forward on the anterior segments, are more upright on the middle segments, and are recurved on the posterior segments. Between the lateral processes is an anterior row of 4 very small spines, and 2 large simple recurved posterior spines, one on each side, near the base of the process. All of the spines with a very minute seta on one side, near the tip.

Posterior segments with the large processes reduced to nearly simple spines, the upper branches smaller and the lower branches separate, so that the subterminal segments have a series of 4 spines along the posterior margin; also the anterior row of 4 small spines is more distinct on the subterminal segments.

Last segment produced beyond the anal valves and slightly decurved, obliquely truncate, and slightly thickened at the apex, with 4 long apical setae; on either side a large divergent setiferous spine and 2 smaller setiferous spines above and between the large spines; also an anterior transverse row of 8 small setiferous tubercles, 4 on each side, one of these near the margin and only slightly removed from the preanal scale.

Anterior subsegments with the surface densely but finely reticulate; posterior subsegments thickly beset above with minute sharp-pointed spicules, including the surface of the large processes; on the sides of the posterior subsegments the spicules are replaced by minute rounded granules.

Anal valves weakly inflated, with 2 vertical grooves at the base of each, not reaching the middle of the valve, the grooves separated by a prominent ridge; surface covered with fine granulation, but the margins of the valves



Fig. 1

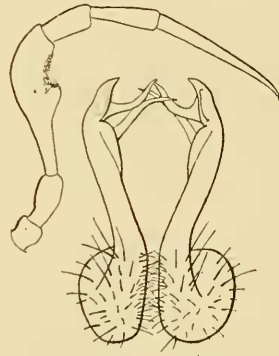


Fig. 2

Hylomus draco, new species

Fig. 1.—Lateral view of tenth segment of male; fig. 2.—gonopods and seventh leg of male.

smooth, compressed, and slightly elevated; 2 small setiferous tubercles present, one near the middle of the valve and another above.

Preanal scale considerably broader than long, subtriangular, the apex broad and faintly emarginate, a long hair rising from each angle, the surface finely granulate and with minute transverse wrinkles.

Legs with joints 1 and 2 short, 3 and 6 very long, 4 about as long as 2, and 5 twice as long; rather sparsely pilose; sterna with a transverse groove distinct on each side but nearly obliterated in the middle, rather sharply angled at the bases of the legs but not distinctly spined.

Secondary sexual characters of the male:

Body smaller and more slender.

Spines of the body larger and more projecting, and the legs longer in proportion to the size of the body than in the female.

First pair of legs shorter and more crassate than those of the female.

Second pair of legs with a small conic tubercle on the inner-posterior side of the first joint bearing the aperture of the seminal duct; third and fourth pairs of legs not modified.

Fifth pair of legs with joint 3 slightly clavate and with a small rather abruptly rounded protuberance on the inner side just above the middle. The tubercle and adjacent surface are more densely pilose but the hairs not forming a distinct tuft.

Sixth pair of legs with joint 3 more strongly clavate and bending inward; a long, thick, bluntly rounded protuberance at the middle on the inner side with a tuft or brush of long hairs at the apex and on the inner face.

Seventh pair of legs with joint 3 still more crassate and arcuate, also with a protuberance on the inner side near the middle somewhat smaller than that of the previous pair of legs, and with a smaller brush of long hairs; also the surface of the joint along the sinus above the protuberance is coated with very short hairs extending from the base of the protuberance nearly to the end of the joint (see fig. 2).

On the sternum between the fourth and fifth pairs of legs is a very large, somewhat fungiform protuberance, bearing 2 tubercles directed forward and outward, a laterally directed tubercle on either side, and an apical broad, short tubercle directed slightly backward and with a large, deep pit or pore indenting the apex; the pore surrounded and crossed by very long hairs; also such hairs on the lateral and anterior tubercles.

Locality and habitat: Lu Shan district, Kiang-si province, Central China, south of Kiukiang; in moist humus near stream below the Yellow Dragon Temple, Kuling, altitude 4,000–4,500 feet. Numerous specimens were collected by O. F. Cook and H. F. Loomis, October 16, 1919. The type is in the U. S. National Museum.

BOTANY.—*New species of Passiflora from tropical America.*¹ ELLSWORTH P. KILLIP, National Museum.

Of the 13 species of *Passiflora* described herewith four are from Mexico and Central America, and are based upon material received by the National Museum since the publication of an earlier paper² by the writer. The remaining species have been detected in the course of a revision of the Passifloraceae of northern South America.

Passiflora dioscoreaefolia Killip, sp. nov.

Stem slender, subtriangular, sulcate, pubescent at nodes with a few hooked hairs, otherwise glabrous; stipules semi-ovate, 1 cm. long, 0.5 cm. wide, attenuate at apex, slightly undulate at margin; petioles up to 2.5 cm. long, finely pubescent with hooked hairs, biglandular about 3 mm. below apex, the glands short-stipitate, 2 mm. long, 2 mm. wide; leaves oblong-ovate, 8 to 10 cm. long, 4 to 5.5 cm. wide, entire, abruptly acuminate at apex, cordate at base (sinus about 5 mm. deep), 5 or 7-nerved, entire and slightly thickened at margin, membranous, sparsely pubescent with hooked hairs above, glabrous beneath; peduncles solitary or in pairs, up to 3 cm. long, 1-flowered, slightly pubescent with hooked hairs; bracts setaceous, 3 to 4 mm. long, scattered; flower 5 cm. wide (when expanded); sepals ovate-lanceolate, 2 cm.

¹ Published by permission of the Secretary of the Smithsonian Institution.

² Journ. Washington Acad. Sci. 12: 255–262. 1922.